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博 士 学 位 论 文

基于实际经济周期理论的中国经济波动研究

The Research on Business Cycle in China:

Based on Real Business Cycle Theory

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摘 要

中国经济周期波动既是一个具有重要现实意义的研究课题,又是一个具有重大理论意义的研究课题。一方面,自改革开放以来,我国宏观经济在高速增长的同时也经历了较大幅度的波动,对实际经济发展产生了很大影响。因此,揭示我国经济周期波动的主要原因和比较适合解释经济周期波动的理论,对维持实际经济的持续、稳定、长期发展具有重要现实意义。另一方面,随着我国社会经济的快速发展和社会主义市场化进程的逐步推进,我国经济管理部门已经充分认识到实际经济周期波动对于我国经济建设与发展的重要性,这就对学术界提出了一个新的命题,即构建适合解释我国实际宏观经济的波动特征事实的理论。

经济波动一直是主流宏观经济学研究的中心命题之一。经过多年发展,国际学术界已经形成了较为成熟的研究方法和比较完整的经济周期理论体系。但鉴于我国宏观经济的较为特殊的周期性波动特征,国外已有研究的结论并不完全适用于解释我国实际经济的周期性波动特征事实。国内现有研究在解释我国宏观经济周期的波动特征事实方面虽然也做出了一些有益的尝试,但总体而言研究尚不够全面和深入,忽略了一些重要问题,如我国实际经济中明显存在的技术进步对实际经济波动有哪些影响?我国实际居民消费的习惯形成对实际经济波动有哪些影响?由我国渐进式改革引致的市场不完全对实际经济波动有哪些影响?相比封闭经济 RBC 模型,开放经济 RBC 模型是否能够更好地解释我国实际经济波动特征?将资本利用会加速折旧的思想引入开放经济 RBC 模型是否重要?由国际金融冲击引致的国际利率冲击对我国实际经济波动有哪些影响?这些关键问题的回答显然对于我们更深刻地认识我国宏观经济波动具有重要意义。为此,本文在国内外已有研究的基础上,借鉴国际上普遍认可的、广泛采用的 RBC 模型方法,分别从封闭经济与开放经济角度,对我国宏观经济周期波动进行全面而深刻的研究,以期能够揭示出我国宏观经济周期波动的主要原因和解释我国宏观经济波动特征的重要理论。

本文由导论和 10 个章节组成。首先是导论。第 1 章是本文的理论基础部分。第 2 章是基本 RBC 模型求解相关方法的介绍部分。第 3 章是中国改革开放以后宏观经济波动的特征事实归纳。第 4 章利用基本 RBC 模型来解释我国实际经济

波动。第 5 章探究考虑了技术进步的三部门 RBC 模型对我国实际经济波动的解释力。第 6 章探究考虑了居民消费的习惯形成、借贷约束与技术进步的三部门 RBC 模型对我国实际经济波动的解释情况。第 7~9 章从开放视角出发,探究考虑了政府部门的小国开放经济 RBC 模型对我国实际经济波动的解释情况。第 10 章是本文的总结部分。

具体而言,第 1 章从经济冲击、经济波动与经济周期认识、经济波动的主要根源和传播放大机制以及相应政策含义等方面对经济周期波动的主要理论,即凯恩斯主义经济周期理论、货币主义经济周期理论、新古典主义经济周期理论、实际经济周期理论和新凯恩斯主义经济周期理论作简要的介绍和评价,尤其对实际经济周期理论的研究进展进行了仔细梳理、详细介绍和评价,为下文研究我国宏观经济波动奠定理论基础。第 2 章着重考察实际经济周期理论研究的相关方法,详细介绍了基本 RBC 模型的构建,并运用对数线性化方法来求解该模型,详细介绍了 H-P 滤波法的运用等,为后文模型的构建奠定数理基础。

第 3 章着重考察了我国改革开放以来实际宏观经济的波动特征,归纳发现:我国实际经济具有既不同于西方发达国家实际宏观经济,也不同于新兴发展中国家实际宏观经济的波动特征,即就业波动较为平滑、投资波动幅度远远高于产出波动幅度,消费波动幅度高于产出波动幅度。这些事实为后文模型的构建奠定了实证证据。第 4 章分别探究了标准 RBC 模型和考虑了政府支出冲击的三部门 RBC 模型的构建,之后利用我国改革开放后的实际经济数据分别对上述两个模型进行了校准研究,并分别利用该模型对我国实际经济波动进行了模拟。模拟结果表明以上两个传统 RBC 模型并不能对我国实际宏观经济波动提供合理解释。

第 5 章着重考察了引入我国改革开放以来实际经济中明显存在的技术进步的三部门 RBC 模型对宏观经济波动特征的解释力。结合上一章中未引入技术进步在三部门 RBC 模型的模拟结果,探讨了技术进步的引入对经济波动的影响。第 6 章着重考察了居民消费的习惯形成和借贷约束对我国实际经济波动的影响。首先,本章利用我国改革开放后省际面板数据,探讨了实际居民消费是否存在明显的习惯形成这一重要问题。结合计量分析结果和我国渐进式改革方式可能引致的借贷约束,本章探讨考虑了居民消费的习惯形成、借贷约束与技术进步的三部门 RBC 模型的构建和求解,利用我国改革开放后实际经济数据对该模型进行了

校准研究，并利用该模型对我国实际宏观经济波动进行了模拟分析。

第7章从开放经济角度，结合我国政府在宏观经济调控中的重要作用，探究了考虑了政府支出冲击和技术进步的小国开放经济三部门 RBC 模型对我国宏观经济波动的解释力。首先分别对我国改革开放后实际经济与 11 个 OECD 国家实际宏观经济的波动特征进行了考察，并归纳出开放经济的总体特征事实；然后通过政府支出与居民消费之间的替代关系，将政府支出冲击引入包括了技术进步的小国开放经济 RBC 模型，对我国实际经济进行模拟分析，以探究技术冲击和需求冲击对我国实际经济波动的影响。第8章从开放经济角度，结合资本的密集性利用会加速折旧的思想，将内生资本利用引入考虑了技术进步的小国开放经济三部门 RBC 模型对我国宏观经济波动进行解释。首先探讨考虑了资本利用与技术进步的小国开放经济三部门 RBC 模型的构建与求解，然后利用我国改革开放后实际经济数据对该模型进行校准研究，并利用该模型对我国实际经济波动进行模拟分析。基于其模拟结果，本文还给出了促进我国居民消费率提高、增强我国投资合理性的相关建议。

第9章从开放经济角度，结合国际金融冲击的思想，探究以国际利率扰动为代表的国际金融冲击对我国宏观经济波动的影响。首先探讨考虑了国际利率冲击、资本利用与技术进步的小国开放经济三部门 RBC 模型的构建与求解；然后利用我国改革开放后实际经济数据对该模型进行校准研究，并利用该模型对我国实际经济波动进行模拟；最后探讨国际利率冲击对各宏观经济变量的影响。

通过上述研究，本论文较好地揭示出我国宏观经济波动的主要原因与可以合理解释我国宏观经济波动的重要理论。主要结论如下：

- 1.我国实际经济中存在明显的技术进步趋势，其可以通过影响产出在消费(包括居民消费、政府消费)与投资之间的分配，改变投资与消费对技术冲击的反应路径。面对相同的技术冲击，它的引入致使消费、投资波动幅度降低，经资本积累的传导，引致了产出波动幅度降低。这就解释了为什么面对较大的技术冲击，宏观经济变量的波动水平依然比较平滑。由此得出传统 RBC 模型需要向包含技术进步 RBC 模型扩展，而后的构建显然更符合有明显增长趋势的实际经济。

- 2.居民消费的习惯形成的引入会增强消费、投资的平滑性，提高就业的波动性。习惯形成的引入致使居民消费、投资与产出波动幅度下降，就业波动幅度上

升；引致居民消费、就业与产出波动的相关性下降，投资与产出波动的相关性上升。这表明居民消费的习惯形成致使居民消费选择的平滑性增强，倾向于选择更多的闲暇消费，这就降低了居民消费的波动幅度、提高了就业的波动幅度。

3.借贷约束的引入会提高居民消费、投资的波动性，降低就业的波动性。由我国渐进式的改革战略导致的市场不完全性所引致的借贷约束，通过影响居民的储蓄行为，致使社会资本总量增加、社会生产和消费增加，并通过生产中资本对劳动的替代，致使就业降低。

4.考虑了技术进步的小国开放经济 RBC 模型可以合理解释我国宏观经济波动。国际贸易影响经济的能力在于打破了产出与消费和投资间的联系。相比在封闭经济下，居民更容易跨期平滑消费以及根据预期回报率调整投资，致使投资波动增大。这就可以解释为什么技术冲击引致了贸易余额更大的冲击，因为它使模型间恢复了一国产出与支出之间的联系。

5.将资本的密集性利用会加速折旧的思想引入小国开放经济 RBC 模型是极重要的。内生资本利用影响经济的能力在于打破了资本与投资的联系、改变了冲击的传导机制，具体来说，它会加速折旧，致使投资波动幅度增大；技术冲击不仅可以通过自身和对内生的劳动供给变动的影响，更重要的是，还可以通过对资本利用的影响，从而对产出产生更大的影响，致使产出波动增大。这就加大了产出与 TB/GDP 的偏离，致使 TB/GDP 的逆周期性增强。

6.利用政府支出与居民消费之间的替代关系将政府支出冲击引入小国开放经济 RBC 模型是极重要的。在开放经济下，政府支出冲击会通过其与居民消费之间的替代改变居民的劳动供给，并通过闲暇的跨期替代得以放大和传播到整个经济从而影响经济波动的形成，如引致居民消费、产出的波动幅度增加和居民消费的顺周期性增强，进而引致居民消费与 TB/GDP 之间的逆向协动性增强。这不仅解释了为什么开放经济下政府支出冲击对宏观经济变量的影响增大，而且使模型能够合理预测居民消费与 TB/GDP 之间的完全逆向协动性。

7.技术冲击和政府支出冲击是我国经济波动的主要冲击源之一。在开放经济下，技术冲击可以解释我国约 90% 的产出波动，是我国经济波动的主要冲击源之一。政府支出冲击是我国居民消费、就业、TB/GDP 波动的重要冲击源。以技术冲击为代表的供给冲击和以政府支出冲击为代表的需求冲击均是我国宏观经济

波动的重要冲击源。

8.以国际利率扰动为代表的国际金融冲击也是我国经济波动的重要冲击源。其对居民消费、就业、产出波动的影响程度相对较小,对居民投资、TB/GDP 波动则具有较大的影响。这表明,国际金融冲击引致居民在国际贸易中面临更多的不确定性,致使其投资波动幅度进一步增大。这就很好地解释了我国资本市场的波动特征。

与现在文献相比,本文的主要贡献体现在以下几个方面。

在观点上:

1.本文将我国实际经济中明显存在的技术进步引入 RBC 模型,来探究该模型对我国经济波动的解释力。这一观点与国际学术界主流的观点是一致的,也与我国改革开放以来实际经济长期保持 10%左右增长率的特征事实相一致。研究表明,技术进步的引入对各宏观经济变量的波动特征具有重要影响。

2.本文首次将居民消费的习惯形成与由市场不完全引致的借贷约束引入 RBC 模型,来探究该模型对我国经济波动的解释力,探究居民消费的习惯形成、借贷约束对实际经济波动的影响。研究表明,居民消费的习惯形成和借贷约束对实际经济变量的波动特征具有重要影响。

3.本文首次利用政府支出与居民消费之间的替代关系将政府支出冲击引入小国开放经济 RBC 模型,来探究该模型对我国经济波动的解释力,探究政府支出冲击对各宏观经济变量波动的影响。研究表明,考虑了政府支出冲击的小国开放经济三部门 RBC 模型合理地解释实际产出与 TB/GDP、居民消费与 TB/GDP 之间的逆向变动关系。

4.本文首次将资本的密集性利用会加速折旧的思想引入小国开放经济三部门 RBC 模型来解释我国实际经济波动。这一观点与国际学术界主流的观点是一致的,但在国内研究中却尚属初次。本文通过实证研究发现,内生资本利用机制的引入是极重要的,它的引入可以提高实际产出与 TB/GDP 之间的逆向协调性,致使模型能够更加合理地解释二者之间的逆向变动关系,这就提高了小国开放经济三部门 RBC 模型对我国实际经济变量之间协调关系的合理解释力。

5.本文首次将以国际借贷利率扰动为代表的国际金融冲击引入小国开放经济三部门 RBC 模型来解释我国实际经济波动,并由此提出了一个全新的重要观

点,即我国实际经济波动是由以技术冲击为代表的供给冲击、以政府支出冲击为代表的冲击和以国际利率冲击为代表的国际金融冲击共同作用的结果。

在方法上:

1.本文采用了 Abara(2006)的建议,利用比较效用模型,将内生居民消费的习惯形成引入 RBC 模型来探究居民消费的习惯形成对我国经济波动的影响。这一模型与国际学术界 RBC 研究方法并不一致,是对居民消费的习惯形成理论研究的一个重要完善。

2.本文采用 Aiyagari(1994)的研究方法,将由市场不完全引致的借贷约束引入 RBC 模型来探究市场不完全对我国宏观经济波动的影响。该方法是对目前国际 RBC 模型研究方法的一个突破,研究表明借贷约束的引入对宏观经济变量波动特征具有重要影响。现在研究,通常假设常数借贷约束形式,忽略了实际经济中借贷约束可能会随着居民收入变化而变动的事实。

3.本文首次利用政府支出与居民消费之间的具有不完全替代性质的替代关系将政府支出冲击引入小国开放经济 RBC 模型,来探究开放经济下政府支出冲击对各宏观经济变量波动特征的影响。研究表明,该替代关系的引入是极重要的。现在研究,通常假设政府支出与居民消费之间具有完全替代关系,忽略了以公共设施改善的政府支出增加会提高居民效用的经济事实,本文的研究为理解在开放经济下政府支出扰动对宏观经济变量的影响提供了一个全新的视角。

4.本文首次结合资本密集性利用会加速折旧的思想,将代表国际金融冲击的国际利率扰动引入小国开放经济 RBC 模型,来探究国际金融冲击对我国宏观经济波动的影响。现在研究,普遍认为国际金融冲击对宏观经济波动并不具有较大的影响。本文的研究,表明国际金融冲击是居民投资、TB/GDP 波动的重要冲击源。

此外,在文献上,本文还全面、系统地梳理了 RBC 理论过去、现在和未来。

关键词: RBC 模型; 经济周期; 中国

Abstract

Understanding business cycles is important to macroeconomic growing smoothly as well as the development of economic theory in China. On one hand, since the reform and opening-up, economic growth in China has been experiencing a high growth speed as well as wild business cycle fluctuations, which has very big impacts on the economic development. For this season, exploring main causes for economic fluctuations in China and building up a business cycle theory suitable to explain business cycle in China are important to maintain the lasting, steady and long-term growth of Chinese economy. On the other hand, with the rapid growth of Chinese economy and the development of China's marketization, Chinese government has fully recognized the importance of business cycle, which poses a challenge to Chinese economic community on how to build up a set of business cycle theories suitable to explain Chinese macroeconomic fluctuations.

Business cycle is one of core problems of mainstream macroeconomic research. After many years development, there have already been many complete business cycle theories and mature research methods in the international economic community. However, these theories are not entirely suitable to China because of peculiar macroeconomic fluctuations. Meanwhile, domestic scholars had done some research on source of business cycles in China and theories in explaining the characteristics of macroeconomic fluctuations, but the research in general is still not comprehensive and thorough and neglects some important issues. For instance, how does the obvious technical progress influence the real business cycle in China? How does the habit formation in consumption influence macroeconomic fluctuations? How does introduction of the borrowing constraints influence the real business cycles in China? Would RBC model in an open economy explain better the characteristics of Chinese business cycle than in a closed economy? How does the introduction of the capital utilization to RBC model in an open economy influence on the characteristics of macroeconomic fluctuations? Is it important? How do international financial shocks

represented by international interest rate shocks influence the real business cycle in China? These key problems need to be solved are obviously important for us to deeply understand business cycles in China. So this thesis refers to modern RBC models and methods generally accepted and widely used in academic community, studies comprehensively and deeply real macroeconomic fluctuations in China from perspectives of closed and open economy respectively based on existing research at home and abroad in order to find out main sources of Chinese macroeconomic fluctuations and theories to explain the characteristics of Chinese business cycles.

This thesis includes an introduction and 10 chapters: the first part is an introduction, chapter 1 is theoretical basis of this thesis, chapter 2 introduces some methods related to the construction and solution of RBC model, chapter 3 is a summary of characteristic facts of Chinese macroeconomic fluctuations after the reform and opening-up, chapter 4 uses the basic RBC model with divisible labor and the basic RBC model with divisible labor and government consumption shocks to explain real business cycle in China, chapter 5 uses the RBC model with government consumption shocks and technical progress to simulate Chinese macroeconomic fluctuations, chapter 6 uses the RBC model with habit formation in consumption, borrowing constraints, government consumption shocks and technical progress to explain the real business cycle in China, Chapter 7 uses the RBC model in a small open economy with government consumption shocks and technical progress to explain Chinese macroeconomic fluctuations, Chapter 8 uses the RBC model in a small open economy with government consumption shocks, technical progress and capital utilization to explain the real business cycle in China, chapter 9 uses the RBC model in a small open economy with government consumption shocks, technical progress, capital utilization and international interest rate shocks to explain Chinese macroeconomic fluctuations, and chapter 10 is the conclusion of this thesis.

To be more specific, chapter 1 is the theoretical basis of this thesis and presents an overview of main business cycle theories from aspects of economic shocks, economic fluctuations and business cycle, such as the Keynesianism business cycle theory, Monetarism business cycle theory, new Classical business cycle theory, real

business cycle theory and new Keynesian economic cycle theory. Especially, it gives a systematic review, detailed introduction and evaluation to the real business cycle theory to lay theoretical basis for following study of Chinese macroeconomic fluctuations. Chapter 2 focuses on introducing the approaches related to RBC model, the construction of the basic RBC model as well as the application of H-P filter methods and uses linearization method to solve the model, which lays mathematical foundation for the research later.

Chapter 3 investigates the characteristic facts of macroeconomic fluctuations in China after the reform and opening-up, finds that there are many facts different from those both in developed countries and emerging developing countries: firstly, consumption's volatility is more than GDP output's; secondly, employment's volatility is much smoothing and investment's volatility is much more than GDP output's. These facts provide empirical evidence for model construction followed. Chapter 4 constructs the basic RBC model with divisible labor and the basic RBC model with divisible labor and government consumption, and then uses Chinese actual data after the reform and opening-up to calibrate these models to simulate Chinese macroeconomic fluctuations. Results of simulations show that these models are not able to explain characteristic facts of Chinese macroeconomic fluctuations well.

Chapter 5 focuses on using the RBC model with technical progress and three sections to explain the real business cycle in China. There have been obvious technical progress in our economic development since the reform and opening up, so this chapter explores the impact of technical progress on macroeconomic fluctuations by combining with research result in the chapter 4. Chapter 6 focuses on discussing impacts of habit formation in consumption and borrowing constraints on Chinese macroeconomic fluctuations. First of all, this thesis uses provincial panel data after the reform and opening-up to explore whether habit formation exists in consumption or not. Considering it may exist market incomplete in Chinese economy, this thesis constructs the RBC model with government consumption, technical progress, habit formation and borrowing constraints caused by market incomplete, and uses Chinese actual data after the reform and opening-up to calibrate the model to explain Chinese

macroeconomic fluctuations.

Chapter 7 is from the view of an open economy to establish a RBC model with three sections in a small open economy that incorporates government consumption shocks and technical progress, in respect of the omnipresence and omnipotence of China's government in macroeconomic management and the fact that there is obvious technical progress in the real economy of China. First of all, it observes features of 11 OECD countries' macroeconomic fluctuations as well as those of Chinese respectively, summarizes the general characteristic facts of open economy; second, it incorporates government consumption shocks into the RBC model in a small open economy by the substitution between government consumption and residents' consumption to explain Chinese macroeconomic fluctuations and to explore impacts of technical shocks and government consumption shocks on macroeconomic economic variables in an open economy. Chapter 8 combining with the thought that capital intensive utilization will accelerate depreciation of it, firstly discusses the construction of the RBC model with capital utilization, technical progress and three sections in a small open economy and then calibrates that model with the actual economic data in order to simulate Chinese macroeconomic fluctuations. Based on the simulation, it also puts forward relevant suggestions on how to promote the consumption and the rationality of investment in China.

Chapter 9 explores impacts of international financial shocks represented by international interest rate shocks on Chinese macroeconomic fluctuations by combining with the thought of international financial shocks. Firstly, it discusses the construction and solution of the RBC model with international interest rate shocks, capital utilization, technical progress and three sections in a small open economy. Secondly, it uses Chinese actual macroeconomic data to calibrate this model and simulate Chinese macroeconomic fluctuations. Finally, it explores impacts of international financial shocks on macroeconomic variables.

Through the above analysis, this thesis revealed well main causes of Chinese macroeconomic fluctuations and important theories that are able to explain the real business cycle in China. Main conclusions are as follows:

1. There is obvious technical progress in real economy in China, which would change reaction paths of consumption, investment and output to technical shocks by influencing the distribution of output between consumption (includes resident's and government's consumption) and investment. With big technical shocks, it would make macroeconomic variables to keep smoothly. So it is necessary to extend the basic RBC model to the RBC model with obvious technical progress that exists in the real economy, which better accords with the real economy with obvious growth trend.

2. The introduction of habit formation in consumption will enhance the smoothness of consumption, investment and output while increase the volatility of employment. It will decrease the correlation between consumption and output and the correlation between employment and output, and will increase the correlation between investment and output. This shows that the introduction of habit formation enhances the smoothness of consumption and leads people to choose more leisure, which reduces the fluctuation of consumption and increases the volatility of employment.

3. The introduction of borrowing constraints will increase the volatility of consumption and investment and decrease the volatility of employment. The borrowing constraints caused by market incomplete that may be from the gradual reform path carried out by Chinese government increases the social capital, output and consumption by influencing savings of residents and decreases the employment by the substitution between capital and labor in production.

4. The RBC model in a small open economy with technical progress could explain well Chinese macroeconomic fluctuations. The ability of introducing international trade is that it breaks up the connection between output and consumption and investment. Compared with in a closed economy, residents in an open economy are more likely to adjust investment according to expected returns, which increases the volatility of investment. Therefore, it explains why same technical shocks make balance of trade to have bigger shocks to macroeconomic fluctuations in the open economy, for it makes the model to restore the connection between output and spending in one country.

5. It is important to introduce the idea that the capital intensive utilization would

accelerate depreciation of it into the RBC model in a small open economy. Endogenous capital utilization could influence macroeconomic fluctuations since it breaks the connection between capital and investment and changes the transmission mechanism of economic shocks. Specifically, it will accelerate depreciation and increase the volatility of investment. Technical shocks would influence output not only through itself and endogenous labor supply, but also through the impact of endogenous capital utilization. This increases the deviation between output and TB/GDP and let TB/GDP, which enhances the countercyclicality of TB/GDP.

6. It is important to introduce government consumption shocks by the substitution between government consumption and resident consumption into the RBC model in a small open economy. In the open economy, government spending shocks will impact business cycles by changing the labor supply. The effect is amplified by the intertemporal substitution of leisure and spreads to the whole economy, thus affects the formation of economic shocks, such as increasing volatility of consumption and output, improving the cyclical of consumption and enhancing the negative correlation between consumption and TB/GDP. This not only explains why the influence of government spending on macroeconomic variables increases in an open economy, but also makes RBC model more reasonable to predict the complete negative correlation between consumption and TB/GDP.

7. Technical shocks and government consumption shocks are two main sources of Chinese macroeconomic fluctuations. In an open economy, technical shocks are main sources of economic shocks, which would account for about 90 percent of output's volatility. Government consumption shocks are main sources of Chinese consumption, employment and TB/GDP fluctuations. Hence, the supply shocks represented by technical shocks and demand shocks represented by government consumption shocks are main sources of Chinese macroeconomic fluctuations.

8. The international financial shocks represented by international interest rate shocks are main sources of Chinese economic fluctuations. Although the impact of them on consumption, employment and output is small, their impact on investment and TB/GDP is big. These show that international financial shocks would increase the

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